

XXII.—*Characters of new species of Helix from India, Mauritius and the Cape of Good Hope; also of a new Mauritian Tornatellina, with remarks on the habits of a Cape Succinea.* By W. H. BENSON, Esq.

1. *Helix Baconi*, nobis, n. s.

Testa anguste perforata, depresso-turbinata, tenuissima, pellucida, pallide cornea, supra nitidiuscula, eleganter decussatim corrugato-striata, subtus polita, radiato-striata; spira elevatiuscula, lente crescente; apice obtuso, fuscato; sutura impressa; anfractibus 5 subconvexis, superioribus supra fascia rufo-fusca angusta, demum obsoleta marginatis, ultimo subcarinato, subtus convexo; apertura subverticali subquadrato-lunari; peristomate acuto, margine columellari verticali cum basali angulum rotundatum efformante, supra brevissime reflexo.

Diam. major 14, minor 13, axis 7 mill.

Hab. rarissime in agris Rohillanis, prope urbem Moradabad Indiae Septentrionalis.

This beautifully sculptured shell is unapproached in character by any of the *Naninae* or the nearly allied *Helices* of North-Western India. The sculpture reminds the observer of that of *H. ligulata*, Fér., and the narrow band below the suture adds strength to the idea; but the form of the shell, its substance, and the number of whorls in relation to the diameter, forbid any suspicion of its being the young of that shell, which, moreover, has never been found in Rohilkhund nor in any neighbouring district, and does not approach the province nearer than 200 miles to the southward.

A single specimen was taken alive, during the rains of 1843, in a bush on the bank of the Gungun River, near Moradabad, by my friend Dr. J. F. Bacon, and was kindly ceded by him to me, from whom he had first imbibed his taste for conchology. No other specimen occurred in the various entomological and conchological excursions made in the vicinity, and the shell has not hitherto been met with in any other quarter. I dedicate it to its zealous and active discoverer.

2. *Helix Orcula*, nobis, n. s.

Testa vix perforata, conico-globosa, cornea, translucida, scabra, oblique irregulariter costulato-striatissima; apice obtuso; anfractibus $3\frac{1}{2}$ convexis, ultimo rotundato, sutura profunda; apertura obliqua rotundata spiram vix æquante; peristomate tenui acuto, margine columellari reflexo, perforationem semitegente.

Diam. 2, axis 2 mill.

Hab. in agro Bengalensi et Baharico, necnon versus occidentem usque ad ripas fluvii Goomty.

This interesting little shell, which calls to mind *Helix harpa*,

Say, of North America (referred to *Bulimus* by Pfeiffer and Reeve) as well as our own indigenous *H. aculeata*, was first discovered in July 1836, and sent to me by the late Lieut. Burkinyoung of the 5th Bengal N. I., who fell in the disastrous retreat from Cabul. He was a zealous student of natural history, and one of the small Indian band whose attention I had the good fortune to direct to the land and freshwater testacea of the Bengal Presidency. He found the species in a mango grove, distant a day's march from Jounpore, and on the road thence to Benares, creeping on the trunks of trees, during very heavy rain. In 1847 Dr. J. F. Bacon rediscovered the shell at Dinapore, near Patna, and has since ascertained that it inhabits the mango groves on the whole route from Barrackpore, in Bengal, to the borders of Sikkim, and thence to Chuprah in Bahar. Jounpore is its most westerly limit known, and lies on the line which appears to separate the moister subtropical climate of the eastern from the more arid tracts of the western provinces;—a circumstance also indicated by the fauna of the Goomty which waters the district, and in which the more tropical forms *Melania variabilis*, nobis, and *M. lirata*, nobis (*M. lineata*, Troschel), first appear in proceeding from the west; while, on the other hand, *M. tuberculata*, Müll., and *M. spinulosa*, Lamk., enjoying with them a joint occupancy of the waters to the eastward, have a wide range to the west, extending even into Affghanistan.

3. *Helix Barclayi*, nobis, n. s.

Testa minute perforata, parvula, depresso-turbinata, cornea, scabra, rude oblique leviterque striata; spira conoidea, apice obtuso; anfractibus 5, lentius convolutis, convexis, ultimo subtus convexo, nitidulo, versus umbilicum excavato, medio leviter carinato, carina antice evanescente; sutura leviter impressa, marginata; apertura late lunata vix obliqua, peristomate tenui acuto, margine columellari brevi, reflexiusculo.

Diam. major 4, axis 2, long. apert. 1 mill., lat. vix $2\frac{1}{2}$ mill.

Hab. infrequens sub lapidibus in collibus Mokæ, apud insulam Mauritiî.

I discovered this neat little *Helix* under stones in February 1847, on the grounds of Sir David W. Barclay at Moka. Its companions here were *H. similis*, and on the surrounding hedges *Cyclostoma rubens*, and a delicate little *Tornatellina*. In a neighbouring ravine I found it associated with *Bulimus clavulinus*, P. and M., *Helix rufa*, Lesson, *H. inversicolor*, Fér. (*Carocolla bicolor*, Lamk.) in all stages from the youngest to the adult, and with the young heliciform and adult examples of *Pupa clavulata*, *fusus*, *modiolus*, &c. I mention these forms particularly, to show that the species cannot be confounded with the young of

any of its associates. *H. inversicolor*, when possessing only three whorls, is double the diameter of *H. Barclayi*, is acutely carinated, and distinguished by its dark colour. The young pupæ are umbilicate, not perforate, are more conoidal, and are characterized by the bold sculpture which obtains in all the Mauritian species of that genus.

Having been the unwilling cause of the erasure of a nominal species bearing the name of *Barclayana*, Pfr., from the catalogue of Helices*, I have much pleasure in dedicating the present shell to the old friend and successful conchological collector on whose grounds I detected it, and who, occupied with the richer and more obvious forms which the island presented to him, had not then directed his attention to the minuter land species.

4. *Helix paludicola*, nobis, n. s.

Testa perforata subgloboso-depressa, tenui, striatula, opaciter albida, punctis translucens fasciisque strigisve purpureo-fuscis ornata; spira elevatiuscula, fusco-rubente, apice obtuso, fusco; anfractibus 5-5½ subarcte convolutis, convexis, ultimo inflato, toto interdum, fere versus aperturam duntaxat purpureo-fusco; apertura rotundato-lunari, intus fusca, peristomate simplici, acuto, margine columellari dilatato, reflexo.

Diam. major 5½ mill., minor 5 mill., axis 3½.

Hab. in palude prope Baszaarm's Kraal, inter Diep Rivier et Muijsenberg Prom. Bon. Spei, in floribus *Zantedeschia* *Æthiopica*, et ad marginem paludis humidum, cum *Succineæ* specie reptans.

This little species, which is allied to, but very distinct from *H. Capensis*, Pfr., and *H. Uitenhagensis*, Krauss, I found on the 1st of September 1846, in tolerable abundance on the border of a marsh between the 12th and 13th milestones, on the road from Cape Town to Simonstown. It was chiefly on the wet ground bordering the marsh, the centre of which was then flaming with broad tracts of a gorgeous scarlet-flowered *Tritomanthe*; a few specimens were in the throat of the corolla of *Zantedeschia* *Æthiopica*, or Pig-lily of the colonists. Although this plant was abundant in every ditch near the Cape at that season, the shell appeared to be confined to the marsh in question. On the 24th of October, when I went to procure a larger supply, very few specimens were to be found.

5. *Helix munda*, nobis, n. s.

Testa aperte et profunde umbilicata depressa, tenui, rugoso-plicatula, translucens, nitidiuscula, cerea, virenti-cornea; spira vix elevata,

* 'Ann. and Mag. Nat. Hist.' for September 1848. Pfeiffer has adopted this view, 'Zeitschrift für Malak.' 1849, p. 71. "No. 305, *H. Barclayana*, Pfr., ist ganz zu streichen, da es nach Benson's Mittheilungen der Jugendzustand von *Pupa Pagoda* ist."

apice obtuso ; anfractibus 4 subplanatis, rapide crescentibus, ultimo antice majori, non descendente ; apertura obliqua rotundato-lunata, peristomate tenui margine dextro superne arcuato, columellari breviter reflexiusculo.

Diam. major 7, minor $5\frac{1}{2}$, axis 3 mill. (spec. nostr.).

Hab. sub monte Capitis Leonis prope Camp's Bay, Prom. Bon. Spei.

I found a single specimen of this delicate shell under trees and fallen leaves in the ravine between the Lion's Head and Table Mountain, near Camp's Bay. A single larger specimen unnamed, but with the locality "Table Mountain" affixed to it, is in the British Museum.

The following shell described by Pfeiffer at page 71. no. 5. of the 'Zeitschrift für Malak.' for 1849, under my manuscript name, from specimens received from me by Mr. Cuming, I had delayed publishing, with the view of instituting a comparison with the allied species *H. rivularis*, Krauss, which is also a denizen of South Africa. I cannot do better than copy the characters given by Pfeiffer.

6. (249 a) *Helix rariplicata*, Benson.

"Testa umbilicata depressa, tenuis, cornea, plicis arcuatis subdistans munita ; spira parum elevata ; sutura profunda ; anfractus 4 convexi, ultimus teres, non descendens ; umbilicus angustus, pervius ; apertura parum obliqua, lunato-subcircularis ; peristoma simplex, rectum, marginibus conniventibus.

"Diam. maj. $4\frac{1}{2}$, min. $3\frac{1}{2}$, alt. 2 mill."

Hab. in Prom. Bon. Spei.

This shell I found in several places about Green Point from April to November 1846. In the latter month it was alive in great abundance clustering under loose stones in a barren tract near the greater Light-House. During the winter season this tract was inundated to a great extent by shallow fresh water.

Near the great Light-House Green Point, at the Round Battery, Simonstown, and in Hottentot's Holland, I procured dead specimens of a shell which appears to me to correspond with *Helix vernicosa*, Krauss, taken by Wahlberg at Natal, but I have not been able to make a comparison of specimens. I may here note that I have not yet exhausted my new species of *Helix* from the environs of Cape Town, and that three (if not four) new species of *Physa* and an *Ancylus* inhabit the waters at the base of Table Mountain.

GENUS TORNATELLINA, Beck.

1. *Tornatellina Cernica*, nobis, n. s.

Testa globoso-conica, tenui, striatula, striis exilissimis spiralibus obsolete decussata, pallide cornea, pellucida, nitida ; spira conica,

apice obtuso, rubente ; anfractibus 4 convexis ; apertura elliptico-ovata, spiram superante, plicis duabus coarctata ; plica 1 lamelliformi parietali, intrante, hyalina, 2nda columellari dentiformi, ad angulum columellæ truncatæ posita ; columella lata, verticali, hyalina, oblique lateque truncata, margine dextro simplici, acuto.

Long. 3 mill., diam. 2-2½ mill.

Hab. in sepibus apud Moka Insulæ Mauritiî.

I discovered this interesting little species in February 1847 in the grounds of Sir D. Barclay at Moka, creeping in showery weather on the leaves of Niccioli hedges. The animal was Heliciform, and I noted it at first in my journal as an *Achatina*, with reference to the truncation of the columella, until the retraction of the animal admitted a view of the parietal plica which winds into the interior of the shell. In form this species much resembles *Torn. globosa*, Petit, but differs in its thinness, sculpture (when viewed under the lens), and in the plaits of the aperture, &c. In its short, twisted, abruptly truncated columella, and in the winding callous ridge on the parietes, the Bolivian *Achatina concentrica*, Reeve, 'Conch. Icon.' pl. 19. f. 106, is related to *T. Cernica*, and will perhaps form another species of the genus. *T. Cernica* affords the only example of this genus known to inhabit the isles of the Indian Ocean ; the species recorded by Pfeiffer, Petit, and others being confined to the Pacific Ocean, the West Indies and South America. I took only two specimens, but Sir D. Barclay writes that he has since been more successful in its capture. I have named the species from "Cerne," one of the appellations of the beautiful island which produces it, and which, with reference to its extent, is so prolific in the land mollusca.

It is further worthy of note that *Helix unidentata* and *H. Cepoides*, gigantic in their genus, seem to indicate a transition from this form, through *H. Studeriana*, to the more regular forms of *Helix* ; and that among these, *H. unidentata* and *H. Studeriana* inhabit the neighbouring island group of the Seychelles.

The *Succinea* which accompanied *Helix paludicola* at the Cape, and which may be *S. Chiloënsis*, Pfr. (*S. elongata* var. γ , Fér.) is decidedly amphibious, notwithstanding the opinion of some authors. Dropped into water, it, at first, crept out of it, but presently I observed it descending, of its own accord, below the margin of the liquid, and twice, within the space of a few minutes, I saw it take to the water, and swim resupinate at the surface like a *Lymnæa*, and ascend the opposite side of the glass vessel in which I had placed it. I was particular in the examination of the animal, with reference to this singular action, and found the upper tentacula short and thick, with the eyes or percipient points at their apex, the lower pair being very short ; the

animal within the shell was blackish brown, the foot livid, and rayed on the upper side with the darker colour. No species of *Lymnæa* occurred to me at the Cape, though I took near Cape Town an *Ancylus* and several species of *Physa* distinct from those discovered by Krauss and Wahlberg in the eastern part of the colony. My first specimens of *Physa* were taken nearly three months after the observation of *Succinea*.

In addition to the above circumstances, I may here note that, in 1832, I took *Succinea* creeping on stones under water in company with *Lymnæa stagnalis*, *peregra* and *auricularia*, *Planorbis marginatus* and *vortex*, *Bithynia impura* and *Physa fontinalis*, in Lough Carrigan, county Cavan, Ireland, which fact I entered carefully in my conchological journal. It militates against the opinion of some authors, and indeed against my own observations on the habitation generally selected by the animal of *Succinea*, which I have had occasion to remark elsewhere in Great Britain, India, Mauritius and Germany. Moreover *Succinea crassiuscula*, nobis, an inhabitant of the whole of Gangetic India, is so independent of the presence of standing or running water, that it frequents the walls of ravines and precipitous banks where no water ever lodges, and where it can receive no moisture but that derived from dews or from the fall of the periodical rains.

Aix la Chapelle, July 30th, 1850.

XXIII.—*Sketch of the Geology of the neighbourhood of Grantham, Lincolnshire; and a comparison of the Stonesfield Slate at Collyweston in Northamptonshire with that in the Cotswold Hills.* By the Rev. P. B. BRODIE, M.A., F.G.S.*

THE object of the present paper is to give a short account of the geology of a portion of the county of Lincolnshire, especially in the neighbourhood of Grantham and Stamford, and to point out its identity in many respects with certain parts of Gloucestershire. The formations observable in the district above mentioned are the Great Oolite, Stonesfield Slate, and Lias. The Great Oolite (and some of the superior overlying groups, including in places the cornbrash) may be traced with considerable regularity from Minchinhampton in this county in a north-easterly direction to Stamford, whence it pursues a more northern course into Yorkshire. The Great Oolite is extensively quarried at Ketton and other places near Stamford, and affords a good building-stone, more or less full of fossils; one bed, in which I found

* Read at the Meeting of the Cotswold Naturalists' Club, June 18, 1850, and with slight alterations at the last Meeting of the British Association for the Advancement of Science, August 1850.